Comments on the hypothesis of implicit serial-position cues¹

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Abstract

It has been suggested by Breckenridge, Hakes, & Young (1965) that in the absence of explicit positional cues, Ss tend to supply their own during the learning of a serial list. The evidence offered in support of this statement was evaluated and it was concluded that the question of "what is learned" in serial learning cannot be answered by a mere comparison of serial-position curves.

Breckenridge, Hakes, & Young (1965) reported a replication of the Lippman & Denny (1964) study in which serial-position curves were compared for groups receiving lists either including or not including an intertrial interval. The results of both studies were in close agreement, showing that the continuous-list condition (no intertrial interval) (a) was more difficult, (b) did not produce primacy and recency effects when position curves were plotted from the item appearing first on Trial 1, but (c) produced strong primacy effects when the first position was defined as the most frequently anticipated item. Breckenridge et al interpreted the latter finding as indicating that ". . . in the absence of explicit serial position cues Ss tend to provide their own (p. 139)." In addition, they suggested that Ss may form such cues with lists in which the starting position on successive trials is varied (e.g., Ebenholtz, 1963; Keppel, 1964). It is with this second suggestion that issue is taken here and the discussion which follows will center around three main points.

In the first place, it should be recognized that the speculations of Breckenridge et al are not based upon the varied-position method, but upon a comparison of a position curve obtained for a control condition with one which was derived from a continuous-list condition (no intertrial interval). On the other hand, an intertrial interval occurs between each trial for the varied-position method, except that the interval follows a different item at the end of each trial. These two procedures, continuous and varied position, may actually produce important differences in serial learning. For example, it is conceivable that S may be able to utilize consistent positional cues in the continuous-list condition, merely selecting one item as the anchor point and defining serial position from that particular point. It seems unlikely, however, that such a procedure could be followed with as much efficiency with the varied-position method since the actual serial position of any subjective anchor point would vary from trial to trial.

Secondly, whether or not a bowed-shaped curve is obtained with the replotting of serial data obtained from the varied-position method (and such appears to be the case for Lippman & Denny, Fig. 4), there still remains the important question of the validity of the assumption that derived "position" curves share all of the functional properties associated with position curves obtained from typical serial lists. Breckenridge et al have chosen to assume the operation of subject-produced position cues in the absence of the explicit position cues in the continuous-list condition, and, presumably, in the condition presently under discussion. While it is not completely clear from their article, it does appear that Breckenridge et al accept the similarity of position curves (actual and derived) as evidence in support of their conclusion that Ss create their own implicit position cues. However, it does not necessarily follow that a similarity of curvature insures a similarity of functional cues. Specifically, there is a large body of research which represents an attempt to specify stimulus cues which are utilized during the learning of a serial list. A variety of such cues has been suggested, e.g., serial position, temporal order, immediately preceding item, and compounds of preceding items. The varied-position method, however, essentially neutralizes serial-position and temporal cues. As acknowledged earlier, it is conceivable that Ss replace explicit positional cues with implicit ones. On the other hand, it is even more likely that Ss may shift to the greater use of other cues, such as the immediately preceding item, in order to learn the varied-position list. Moreover, the derived position curves reported by Lippman & Denny and by Breckenridge et al do not deny this latter possibility. That is, it is entirely possible that Ss select an anchor point and begin their item-to-item chain of associations from there. This is not to say that contiguous associations are the inevitable result of varied-position presentation—this is an issue which must be tested in experiments designed to distinguish between these two explanations. The main point to be made here is that the question of "what is learned" under the varied-position condition cannot be answered by a mere comparison of position curves.

Thirdly, the hypothesis of implicit position learning must be evaluated in the light of available data. (a) Lippman & Denny asked their Ss to indicate which item in the list seemed to be "first." This measure of "subjective first" was dropped "...since many Ss evaded the question, failed to understand what was being

asked, or tried to recall which item had, in fact, been presented first (p. 498)." While this finding does not necessarily refute the implicit-cues hypothesis, it does seem strange that an item which is presumed to be a subjective positional cue is not recognized or reported by S when questioned following learning. (b) Shuell & Keppel (in press) studied the transfer from a serial list, learned under constant or varied-position methods, to a paired-associate list in which the contiguous serial pairings were maintained or in which the pairs were unrelated to the previous serial list. As part of a larger study, Postman & Stark (in press) took similar determinations with the constant-position method. Both studies were in close agreement, showing marked positive transfer when the pairs corresponded to the contiguous ordering of the items in the serial list. More important for this discussion, however, was the significantly greater positive transfer that Shuell & Keppel found when the serial list was learned under the varied-position method. While these results strongly support the notion that serial chains are developed during serial learning, it is possible that a portion of the positive transfer may have been mediated via positional associations. Such a notion, however, does not explain the increase in positive transfer for the varied-position condition. That is, if this hypothesis were correct, a reduction in positive transfer for the varied-position condition should be expected, assuming that the varied-position method minimizes the use of a consistent positional cue. This would also be true if Ss provided themselves with implicit positional cues, since the subject-produced cues are probably less efficient than those afforded by a serial list presented in a consistent serial ordering. Of course, if one wishes to assume that implicit cues are stronger than explicit ones, the hypothesis is able to account for the findings of Shuell & Keppel. (c) Keppel (1964) found significantly greater retroactive inhibition (RI) when the serial lists were learned by the constant-position method than by the varied-position method. If it is assumed that in learning two serial lists an A-B, A-C relationship occurs between the serial-position cues (explicit or implicit) and the two sets of responses in the two lists, the occurrence of RI may be explained.

In order to account for the reduced RI obtained with the varied-position method, it is necessary to assume that implicit position cues are weaker than explicit ones. However, it must be noted that the assumption that explicit cues are stronger, required to account for the difference in RI obtained with the two methods, is incompatible with the assumption required to account for the difference in positive transfer which is also obtained with the two methods.

In summary, Breckenridge et al suggested that under the varied-position method Ss utilize implicit positional cues to learn the serial list. It was argued here that a similarity of actual and derived position curves does not constitute a demonstration that similar processes are operating in the two situations. It was further argued that any particular assumption concerning the relative strengths of implicit and explicit position cues (i.e., that one is stronger than the other), which is consistently applied to available data, is unable to explain both of the findings reported in the last paragraph. In contrast, the assumption that the varied-position method results in stronger serial chains is able to account for these two interactions produced through the comparison of the constant-position and varied-position methods of serial learning.

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Note

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For Reply by K. Breckenridge, D. T. Hakes and R. K. Young see page 474.